

REMARKS

Claims 2-8 are cancelled.

Claims 1 and 9-23 are pending in this application.

Claims 18-23 are withdrawn from consideration.

Claims 1- and 9-17 are rejected.

In the office action dated Dec. 2, 2008 indicates that claims 1, 9-13 and 16-17 are rejected under 35 USC 102(b) as being anticipated by a paper by Antaki et al.

The office action characterizes the Antaki paper as a single article on control of air vehicles. However, the characterization is not accurate. According to page 19, the Antaki paper provides a "review of the three most recent winning applications for the IEEE Control Systems Technology Award [which] clearly illustrated the diverse nature of control engineering."

Two of the articles are discussed below: the article by Michael Piovoso, which relates to "Industrial Process Monitoring"; and the article by Siva S. Banda, which relates to "Multivariable Control for Air Vehicle." The article by Antaki and Paden is not discussed below.

The article by Piovoso describes the use of principal component analysis (PCA) for monitoring an industrial process. PCA defines the directions along which most of the data points are the closest. A model having the correct number of principle components is generated. The model can then be used to monitor operations and identify abnormal data (that is, check new sensor data for faults). Q and T2 statistics can be used to identify the stage responsible for the abnormal data.

The article by Bando describes multivariate control for air vehicles. It does not mention the use of PCA. Instead, it describes a feedback linearization-based control. Control systems designed according to dynamic inversion can describe the motion of a

vehicle using non-linear equations. Figure 9 illustrates such a control for an aircraft. The control can be augmented by a neural-network (NN).

Thus, Piovoso and Bando describe two different approaches to control applications. These two different approaches just happen to appear in the same paper.

Claim 1 has been amended to recite the subject matter of claim 9. Claim 1 has also been amended to clarify that PCA-reduced set of data is used *in conjunction* with the system level health to determine a health assessment parameter for the component.

An example of parameters of a component is operating parameters of an actuator (paragraph 17). An example of a system health measure is a health power spectrum (paragraph 22). An example of determining a health assessment parameter is now recited in amended claim 9.

The Piovoso article doesn't teach or suggest how his control can be adapted to an air vehicle. The Piovoso article does not teach or suggest using PCA reduction of component data *in conjunction with* system health information to derive a measure of component capability. The Piovoso article doesn't teach or suggest using that measure to reconfigure at least one of the component and a flight control system to compensate for the component during operation if the health assessment measure indicates a degradation of the component.

The Bando article describes a control for air vehicles, but takes an entirely different approach (control systems designed according to dynamic inversion). The Bando article doesn't teach or suggest the use of PCA-reduced component data *in conjunction with* system health information to derive a measure of component capability. The Bando article doesn't suggest a logical jump from Piovoso's control to the method of amended claim 1.

Therefore, amended claim 1 and its dependent claims 9-17 and 19-23 should be allowed over the Antaki paper.

The office action still does not examine claims 19-23. It relies on the restriction requirement in the office action dated March 25, 2005. In that office action, restriction was required between claims 1-17 and 18-23 because claims 18-23 allegedly have separate utility "such as using linear eigenvectors equations [to] analyze multiple components." While that argument might be valid for claim 18, it is no longer valid for claims 19-23. In the previous response, claims 19-23 were amended to depend from claim 1. Therefore, claims 19-23 no longer have separate utility. They depend on the features recited in claim 1. Accordingly, claims 19-23 should also be examined.

The Examiner is encouraged to contact the undersigned to discuss any remaining issues prior to mailing another office action.

Respectfully submitted,

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